

## Conclusions from Long Term Experience in Measuring Poverty with Price Indices

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### Abstract

Measuring poverty requires welfare indicators that are generally derived from surveys on the social and economic status, activities and behaviors of households. These indicators are deflated with properly defined price indices when poverty is compared between two different points in time or space. However the conceptual and methodological framework of most consumer price indices are not always aligned with poverty patterns. Their poverty relevance is being discussed in this paper.

Key Words: Expenditures, Goods and Services, Poverty, Prices, Utility.

### 1. Introduction

Most poverty analyses are based on international concepts and models of socio-economic development. They rely on a statistical framework that was not initially meant to measure poverty phenomena. Related quantitative assessments evolve around a narrowly standardized notion of households as opposed to larger groups or communities and suggest that well-being is primarily driven by the possession of material assets. The methodological approaches being used are underpinned by pre-defined logical and linear relationships between major economic indicators and don't accommodate social values and circumstances as possible predictors of poverty behaviors, trends and levels. For example, using price indices to help gauge poverty levels or changes over time and space supposes that the standard of living of any segment of society, including the poor, depends on two major aspects: the evolution of prices of a specified basket of goods and services and the relative importance of these items in the basket. It seems, from the review of most consumer price index methods, that it does not truly matter whether the said basket reflects the volatility of poverty situations.

Therefore, three questions arise: are consumer price indices relevant for poverty measurement (section 2 in this paper), do they reflect the needs and opportunities facing the poor (section 3), and finally can a more comprehensive approach be developed (section 4).

### 2. Are Consumer Price Indices Relevant for Poverty Measurement?

A CPI compiled for a given population group is meant to measure the ratio of the cost of maintaining the standard of living or utility of that group over time. The CPI definition and implementation are based on a consumer theory the rationality of which is not poverty-related, hence its limitations. Four types of limitations or discrepancy can be underlined. They relate to utility, product quality, purchasing power, as well as to the relevance of household survey results.

First limitation - Prices of different products in any economy change at different rates. The average consumers tend to diversify their consumption and change it away from the more expensive items. All that matters for them is to maintain their function of consumption, in the sense that if an item they used to purchased has become too expensive, they will look for a cheaper substitute. However, the inelasticity of poverty income is such that this shift is not always possible. Most CPI are Laspeyres-type indices based on a fixed basket of goods and services. Whether the poor or even the population at large has moved to cheaper items and reduced their consumption of the most expensive items, the CPI will assume that the same quantity of the expensive items is still being purchased. This is misleading as it tends to imply that the poor can afford items in the constant quantity irrespective of the increase of relevant prices. Yet, we know that in some cases, the price rise affects the entire class of products. This results into either abandoning all those products, or trying to buy lower quantities of the same items at prices that are therefore even higher than indicated by the price index. For instance, LCU denoting the

Local Currency Unit in a particular country, if the prices of fish increase by 10%, a poor household that used to buy 100 grams of fish per day at LCU 200 for 100 grams (and can't afford LCU 220 for 100 grams) may resort to buying 75 grams only. If the unit price for 25 grams is LCU 65, the 75 grams will cost him LCU 195, which is almost the same level of expenditures as before. In principle, standard units of measurement are used in the CPI, such as 1 kilogram, 100 grams, 1 liter, 1 pound, etc. Items are generally sold as multiple of the standard units of measurement. The larger the quantity the lower the unit price for a given item. Therefore, if a poor person can't even afford any longer a quantity equal to the unit of measurement, he will look for a smaller quantity which, if available on the market, will be provided to them at a higher unit price. Five lessons can be derived from the above example:

- Poverty incomes or expenditures are not as high as suggested by the CPI weights and price levels; also, CPI weights do not reflect the change over time and volatility of the consumption structure of the poor;
- Assuming that the basket of goods and services established at the inception of a CPI is a representative sample of the bundle of commodities consumed by a poor household, there is no evidence that this remains true for updated baskets in subsequent years;
- The units of measurement in CPI data collection process should be revised on a regular basis to reflect the adaptive behavior of poor buyers;
- The CPI inflation rate must be adjusted for retail fragmentation. Denote  $R$  the CPI inflation rate ( $R < 1$ ) and  $r$  the price ratio between an item sold in a given quantity and the same item sold in a smaller quantity ( $r > 1$ ), the actual price increase affecting the poor is  $\rho = r(1+R)-1$ . Obviously  $\rho > R$ ; poverty inflation rate is higher than general inflation
- The item substitution procedure implemented in a CPI should reflect the preferences of the poor for similar items.

Second limitation - Generally, all descriptive characteristics of CPI items are not provided to price collectors, who may collect items of different quality from a survey period to another. However in a CPI based on a fixed basket of goods and services, it is implicitly assumed that the quality of products remains unchanged. In most CPIs, a tomato is a tomato, rice is rice. Yet the higher the quality the more expensive the product. If the distinction is not established, one may believe that the poor purchase their items at the same price as recorded in the CPI. Three lessons can be drawn from this:

- By attributing price rises to inflation rather than to quality changes, the CPI tends to imply that the poor who purchase items included in the CPI basket afford CPI collected prices;
- Standard product descriptions should be developed from a poverty perspective, with a view to establishing at least two classes of equivalence of products for each type of item: the poverty class of equivalence and the standard class of equivalence. For each type of products, prices should be collected from both classes;
- This dual price collection will allow to estimate a quality adjustment factor  $v$  ( $v < 1$ ) for each type of item. By multiplying the average price of items in the considered group of items by  $v$  we obtain a proxy of the actual cost/expense borne by the poor for the items they can afford. It is that estimate that should be multiplied by the quantity purchased for each group of items.

Third limitation - Most CPIs do not include bargaining. In most CPIs, standard survey methods are applied even in a bargaining environment, and hawking is not included in the sample of outlets. Where prices are negotiated by price collectors, no analysis is made of the attitude of price collectors vis-à-vis the behaviour of an average purchaser. Regarding bargaining, four types of biases can be pinpointed: time sampling bias, bargaining power bias, opening price bias, bonus bias.

Time sampling bias - Most people decide on where (outlets) and when (time of the day or night) they will purchase goods according to their availability and more importantly with a view to maximising their individual satisfaction. However, the consumer behaviour is difficult to address in price collections as, in most cases, price enumerators are imposed administrative and technical constraints whereby they have to collect prices according to predetermined monthly or weekly schedules. They may therefore

visit some outlets on days and at times in the day when prices are not necessarily representative of prices prevailing at those outlets.

In contexts where prices can significantly vary in a same day from the opening to the closing of an outlet, those prices may not correlate with modal or average prices actually afforded by purchasers.

Bargaining power and opening price bias – Where prices are bargained by price collectors to emulate the purchasing behaviour of regular customers, CPI prices tend to be lower than prices paid by the poor who in general don't have significant bargaining power, although it is worth noting that they may in some places benefit from the vendor's pity. In some cases, the difference between the opening price announced by the seller and the actual transaction price bargained by an average purchaser is as high as 30% for some products. This gives an indication of how much more a poor can pay compared to the average bargained price.

The bonus bias – Quantities purchased by the poor are obviously lower than those bought by an average purchaser. Therefore where a bonus is provided to the average purchaser in proportion to their purchase, the bonus granted to the poor is rather small or of lower quality.

Fourth limitation - Another type of limitation relates to household consumption surveys whose results are used to determine the income/expenditure structures of households as well as their reference basket of consumer goods and services. As far as the sample frame and geographical coverage are concerned, household surveys generally represent a whole nations' population – thus covering all regions/provinces and major urban and rural areas in the country - or a selected segment of the population. Some poverty studies are based on household consumption surveys conducted in rural areas and in urban districts largely considered as poor. Where such targeted surveys were not conducted, the studies rely on data extracted from surveys with larger geographical and population coverage. Rarely, if not, never are there surveys truly targeting and exclusively covering the poor. This is explained by the geographical volatility and spread of the phenomenon whereby poor individuals and households are not always concentrated in specific areas in a particular city. When surveys or data extracted from surveys relate to poverty-dense areas, they tend to overlook the many poor whose individual strategy benefits from the solidarity of better-off family members who belong to other households.

This raises the question as whether “Household Definitions Matter in Survey Design” [Lori Beaman et al, 2011]. The analysis of poverty from another perspective suggests “that different household definitions have significant implications for household composition as well as for assets and consumption statistics.” [Lori Beaman et al, 2011]

The household as a standard unit of observation is typically defined as a group of people sharing common food and shelter. This notion is defeated in contexts where the poor develop individual strategies that lead them to eating outside the household or benefiting from other in-kind transfers which they cannot share with their reference household.

Whether a household survey collects consumption expenditure or household income or both, either data is used to estimate the weights to be applied to elementary indices in the calculation of the overall CPI. In most countries, the index is not a chain-index, assuming that the consumption pattern remains quasi-unchanged during two benchmark surveys. This is a quite strong assumption given the volatility of poverty, in terms of income and consumption.

### **3. Opportunities and needs**

If the pursuit of happiness underpins the consumer theory, how relevant is the theory or any construct thereof for poverty measurement? What do we truly know about the individual or collective strategies of the poor? Obviously the poorer a person, the less relevant the notions of utility maximization or indifference curves. A different theory is yet to be developed that will bring together various poverty definitions and lay emphasis on survival and attempts to regain minimum and sustainable stability. Regardless of whether poverty is viewed as an individual or collective failure or the result of restricted opportunities, an alternative and holistic approach should be developed to address poverty as a societal problem and identify all major economic and social aspects that may underpin poverty whether they result from decisions made by the poor themselves or by other members in the society. The approach

must be inclusive in terms of considering poverty as affecting the entire population in a given country and not only the poor. Only through such approach will one be able to identify all possible causes and be able to help the people concerned remedy them.

Introducing the CPI as a cost of living index, Diewert (1999) proposes an N dimensional vector of commodity consumption in a given period as  $q \equiv (q_1, q_2, \dots, q_N)$ . He also notes the vector of period t market prices facing each household as  $p^t \equiv (p_1^t, p_2^t, \dots, p_N^t)$  for an initial period  $t=0$  and a subsequent period  $t=1$ . He further assumes that “each household is affected by an M dimensional vector of environmental or demographic variables or public goods,  $e \equiv (e_1, e_2, \dots, e_M)$ .”

Learning from his approach, we are suggesting that a poor individual or household has an income that will help him purchase a bundle of goods and services represented by vectors of quantity  $q$  and prices  $p^t$ . As prices change over time and the poor are struggling to maintain their utility or rather, their survival,  $q$  cannot be deemed constant from one period to another, hence the notation  $q^t \equiv (q_1^t, q_2^t, \dots, q_N^t)$ . For the poor, we can safely assume that  $p^0 \bullet q^0$  is already minimal and there is no point in trying to further minimize their expenditure. What the poor rather try to achieve is to minimize any ill-effects of their environmental and demographic circumstances and benefit from any available opportunities. The social, environmental or demographic variables or public goods are referred to here as opportunities and noted  $\omega \equiv (\omega_1^t, \omega_2^t, \dots, \omega_M^t)$ . Poor’s access to the existing opportunities depends on various factors that are subjective (self-esteem, education, network connections, etc.) or objective (official safety nets, local poverty reduction programs and projects, food stamps, etc.). While the opportunities may be available to everyone, each one will benefit from all or part of them depending on their own efforts, the way they can mobilize their social network, their compliance with criteria attached to the opportunities, etc. This defines what we can call here the opportunity eligibility or access which can be considered as a price  $\lambda_j^t$ , although it is not easy to translate it into quantitative terms.  $\lambda_j^t$  is the price to be paid by a poor individual or household at period t to access opportunity  $\omega_j$ . In a broader sense, the environment can include hindrances or constraints or other impediments that can be treated as negative opportunities.

A poor’s survival function depends both on the levels of commodity quantities  $q_i^t$  he can afford at the prevailing prices  $p_i^t$ , the actual opportunities  $\omega_j^t$  he can benefit from owing to his advantages or efforts  $\lambda_j^t$  and the adverse circumstances (negative opportunities) he may face.

#### 4. Can a more comprehensive approach be developed?

##### 4.1. From CPI to a more comprehensive poverty information tool

If we want to assess the actual impact of price changes on poverty situations, we need to study those prices against the backdrop of all identifiable poverty dimensions. This requires a convergence framework to be developed. Let’s suppose this framework is structured as a 6-block matrix (Fig. 1).

Fig.1 – A Six-Block Matrix

|  |  |                             |
|--|--|-----------------------------|
| I<br>Opportunities = Systems of Living Condition; and Individual or Household Situations<br>( $\omega_j^t$ ) | III<br>Utility = Bundle of Needs Own Defined in Relation to Efforts the Poor Themselves are Ready to Make<br>( $p^t \bullet q^t$ ) | V<br>Individual Assessments |
| II<br>Poverty Indicators Including (poverty) Consumer Price Indices  | IV<br>Active Statistics: Related to Poverty Programs, Projects and Actions (including measurable $\lambda_j^t$ )                   | VI<br>Impact Measurement    |

Blocks I and III in this matrix can be described as follows:

- Opportunities ( $\omega_j^t$ ), i.e. the systems of living conditions that characterize the environment in which the poor live, and the specific situations facing the poor as a result of his interaction (passive or active, intended or not, conscious or not) with those systems. A person’s or

household's specific situations are the impacts of the systems of living on their social and economic behavior and status.

- Needs of the poor, i.e. what they consider as their welfare or their utility. We suggest here the utility ( $p^i \bullet q^i$ ) to be defined by the poor himself. In a poverty context a poor's bundle of needs is the utility for which he is ready, willing and eager to make all necessary efforts ( $\lambda_j^i$ ) by primarily using the resources/opportunities ( $\omega_j^i$ ) available in their environment.

We thus have two qualitative blocks of descriptive information to be collected and analyzed.

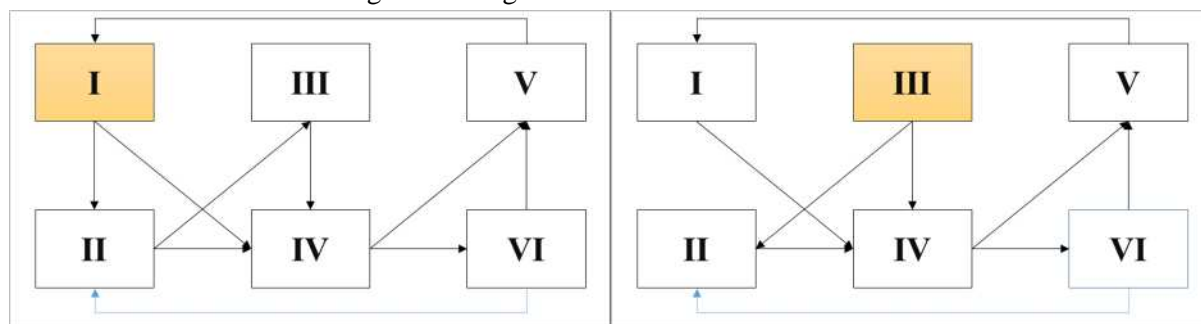
Quantitative data (Block II) related to Block I are the standard poverty indicators that include macroeconomic statistical systems, household consumption survey results and other poverty statistics, including (poverty) consumer price indices. Bundle of needs reported in Block III will be assessed through ad hoc surveys and interviews of individuals and households. These surveys will also be used to make an inventory of programs, projects and actions designed and implemented to satisfy the bundle of needs. Specific emphasis will be laid on actions decided and implemented by the poor themselves, for we believe no sustainable solution to poverty can be achieved unless the poor are the major and lead actors of the required efforts. All these active solutions/efforts can also be described with specific statistics (Block IV)

These statistical measurements will lead to a quantitative assessment of the impact of the programs, projects and other individual or collective actions on poverty reduction or aggravation. Actually the assessment will be conducted at two levels: at macro or meso level in order to have a global picture for the whole country or a targeted region, locality or group of people (Block VI); and at the level of the poor themselves (Block V). Indeed, their own assessment is in our view the key to deciding which additional measures should be taken at their own level with or without any third party support – whether it's government, development partners or other institutions.

#### 4.2. How to navigate the tool?

This poverty information tool can read in several ways: row-wise, column-wise, or in an iterative manner.

Fig.2 – Starting from Either Block I or Block III



For example, as shown in the left hand side box of Fig. 2, the analysis of the system of living conditions, qualitatively (Block I) can be the starting point that will require quantitative analysis (Block II) and needs assessment (Block III) before deciding actions (Block IV). Then, while listening to individual assessments of impacts (Block V), a quantitative measurement of impacts can be conducted (Block VI), with the hope that the underlying actions have somehow modified the systems of living conditions (back to Block I). The right hand side box of the figure suggests the reading process to start from Block III.

### 5. Conclusions

The above discussion of the relevance of consumer price indices for poverty measurement calls for utmost humility in the face the complexity of systems of living conditions in which the poor are faced with ever and fast changing deprivation situations. The general limitations of CPIs are further exacerbated when CPIs are used to compare poverty over time or space. Some of the discrepancies and biases resulting from those limitations can be reduced by making appropriate adjustments where possible. However, that does not guarantee that a truly poverty CPI would help improve the standard of

living of the poor. An integrated information tool can be developed as suggested in this paper to help show how the initial conditions of poverty in a particular environment are ultimately modified or not by development programs and the actual efforts made by the poor themselves.

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